

INTERNATIONAL RECTIFIER



1N3879, 1N3889, 6FL, 12FL, 16FL SERIES

6A, 12A and 16A Fast
Recovery Rectifiers

Major Ratings and Characteristics

	1N3879 -1N3883	1N3889 -1N3893	6FL...	12FL...	16FL...	Unit
I(F(AV)) [†]	6*	12*	6	12	16	A
IFSM	50Hz 60Hz	72 75*	145	110 150	145 190	A
I _z _t	50Hz 60Hz	26 23	103	60 55	103 94	A ² s
$\sqrt{\frac{I_z}{t}}$		363	1452	855	1452	A ² /s
T _{rr} range		see table				ns
V _{RRM} range		50 - 400*		50 - 1000		V
T _j range		-65 to 150		°C		

* JEDEC registered values.

† At max. T_C = 100°C.

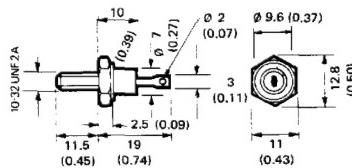
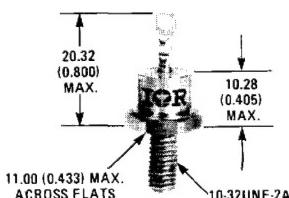
Description

This range of fast recovery diodes is designed for applications in DC power supplies, inverters, converters, choppers, ultrasonic systems and for use as free wheel diodes.

Features

- Short reverse recovery time
- Low stored charge
- Wide current range
- Excellent surge capabilities
- Standard JEDEC types
- Stud cathode and stud anode versions
- Types up to 1000V V_{RRM}
- Fully characterised reverse recovery conditions

CASE STYLE AND DIMENSIONS



Conforms to JEDEC : DO-203AA (DO-4)

IEC 191-2 : A3U

BS 3934 : SO-10A

DIN 41885 : 101 C 2

All dimensions in millimetres (inches)

REVERSE VOLTAGE RATINGS

Part Number	① ②	VRMM — Max. Repetitive Peak Reverse Voltage	VRMM — Max. Non-Repetitive Peak Reverse Voltage $t_p \leq 5 \text{ ms}$	IR — Max. Reverse Current At Rated VR		
				T _J = 25°C	T _J = 100°C	T _J = 150°C
1N3879		50	75	0.015*	1.0*	3.0*
1N3880		100	150	0.015*	1.0*	3.0*
1N3881		200	250	0.015*	1.0*	3.0*
1N3882		300	350	0.015*	1.0*	3.0*
1N3883		400	450	0.015*	1.0*	3.0*
1N3889		50	75	0.025*	3.0*	5.0*
1N3890		100	150	0.025*	3.0*	5.0*
1N3881		200	250	0.025*	3.0*	5.0*
1N3882		300	350	0.025*	3.0*	5.0*
1N3883		400	450	0.025*	3.0*	5.0*
6FL5S02	6FL5S05	6FL5S10	50	75	0.050	—
6FL10S02	6FL10S05	6FL10S10	100	150	0.050	—
6FL20S02	6FL20S05	6FL20S10	200	275	0.050	—
6FL40S02	6FL40S05	6FL40S10	400	500	0.050	—
6FL60S02	6FL60S05	6FL60S10	600	725	0.050	—
—	6FL80S05	6FL80S10	800	950	0.050	—
—	6FL100S05	6FL100S10	1000	1250	0.050	—
12FL5S02	12FL5S05	12FL5S10	50	75	0.050	—
12FL10S02	12FL10S05	12FL10S10	100	150	0.050	—
12FL20S02	12FL20S05	12FL20S10	200	275	0.050	—
12FL40S02	12FL40S05	12FL40S10	400	500	0.050	—
12FL60S02	12FL60S05	12FL60S10	600	725	0.050	—
—	12FL80S05	12FL80S10	800	950	0.050	—
—	12FL100S05	12FL100S10	1000	1250	0.050	—
16FL5S02	16FL5S05	16FL5S10	50	75	0.050	—
16FL10S02	16FL10S05	16FL10S10	100	150	0.050	—
16FL20S02	16FL20S05	16FL20S10	200	275	0.050	—
16FL40S02	16FL40S05	16FL40S10	400	500	0.050	—
16FL60S02	16FL60S05	16FL60S10	600	725	0.050	—
—	16FL80S05	16FL80S10	800	950	0.050	—
—	16FL100S05	16FL100S10	1000	1250	0.050	—

REVERSE RECOVERY CHARACTERISTICS

	1N3879 — 1N3883	6FL...			12FL...			16FL...			Unit	Conditions
		S02	S05	S10	S02	S05	S10	S02	S05	S10		
t _r	150	150	110	285	490	100	250	430	90	225	390	ns
	300*	300*	200	500	1000	200	500	1000	200	500	1000	ns
I _{RM(REC)}	Max. peak re- covery current	4*	5*	—	—	—	—	—	—	—	—	I _F (AV) = π x rated I _F (AV)
	Max. reverse re- covered charge	400	350	230	1700	5000	200	1300	3800	150	1100	3000 nC
Q _{RR}	Max. reverse re- covered charge	400	400	200	1200	5000	200	1200	5000	200	1200	5000 nC
												I _F (AV) = π x rated I _F (AV)

ELECTRICAL SPECIFICATIONS

	1N3879 — 1N3883	6FL...	1N3889 — 1N3893	12FL...	16FL...	Unit	Conditions		
FORWARD CONDUCTION									
I _F (AV)	Max. average forward current	6*	6	12*	16	A	180° conduction, half sine wave, T _C = 100°C		
I _{F(RMS)}	Max. r.m.s. forward current	9.5	9.5	19	25	A			
I _{FSM}	Max. peak one-cycle non- repetitive forward current	72	110	145	180	A	t = 10 ms		
		75*	115	150*	190		t = 8.3 ms	With rated VRMM	Sinusoidal half wave, initial T _J = 150°C
		85	130	170	215		t = 10 ms	VRMM = 0	
		90	135	180	225		t = 8.3 ms		
I ² t	Max. I ² t for fusing	26	60	103	160		t = 10 ms	With rated VRMM	
		23	55	94	150	A ² s	t = 8.3 ms		
	Max. I ² t for individual device fusing	36	88	145	230		(t = 10 ms)	V _{RRM} = 0	
		33	78	130	210		t = 8.3 ms		
I ² √t	Max. I ² √t for individual device fusing	363	856	1452	2290	I ² √t	t = 0.1 to 10 ms		
V _{FM}	Max. peak forward voltage	1.4*	1.4	1.4*	1.4	V	I _F = 25°C, I _F = rated I _F (AV) (D.C.)		
		1.5*	1.5	1.5*	1.5		T _C = 100°C, I _F = π x rated I _F (AV)		

*JEDEC registered value.

**Suffix "SO2" may be omitted, i.e., 12FL10 implies 12FL10S02,

12FL60 implies 12FL60S02.

①Types listed are cathode to case; for anode-to-case include "R" in code, i.e., 1N3879R, 6FLR20S10, 16FLR40S02.

① I_R(AV) @ rated I_F(AV) and V_{RRM}, and T_C = 100°C.② I_R @ rated V_{RRM} and T_J = 150°C.③ I₂t for time t_x = I² √ t * √ x

④ When these devices are ordered without a suffix, e.g., 40HFL, the order will be filled with devices that meet the SO2 specification.



Thermal and mechanical specifications

		1N3879 -1N3883 6FL...	1N3889 -1N3893 12FL...	16FL...	Units	Conditions
T _j	Junction operating temperature range	-65 to 150			°C	
T _{std}	Storage temperature range	-65 to 175			°C	
R _{thJC}	Maximum internal thermal resistance, junction to case	2.5	2.0	1.6	deg C/W	DC operation
R _{thCS}	Maximum thermal resistance, case to heatsink		0.5		deg C/W	Mounting surface flat, smooth and greased.
T	Mounting torque to nut ±10%	10.5			lbf.in	Lubricated threads
		0.12			kgf.m	(Non-lubricated threads)
	Mounting torque to device	1.2			Nm	
		11.5 (13.5)			lbf.in	
wt	Approximate weight	0.13 (0.155)			kgf.m	
		1.3 (1.36)			Nm	
Case style		DO-203AA (DO-4)			JEDEC	

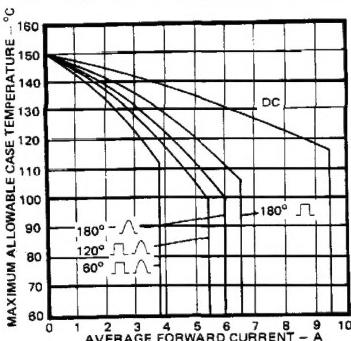
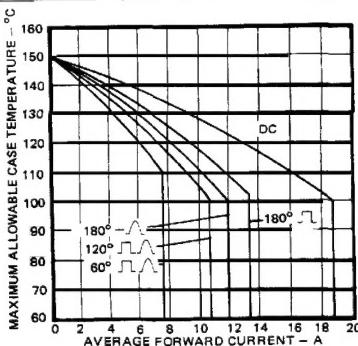
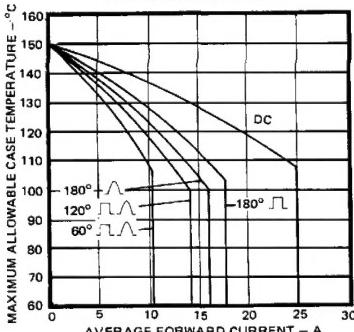
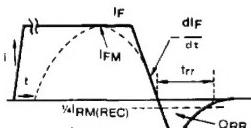
Fig. 1 – Average Forward Current Vs. Maximum Allowable Case Temperature,
1N3879 and 6FL SeriesFig. 2 – Average Forward Current Vs. Maximum Allowable Case Temperature,
1N3889 and 12FL Series

Fig. 3 – Average Forward Current Vs. Maximum Allowable Case Temperature, 16FL Series



I_F , I_{FM} = Peak forward current prior to commutation
 $-dI_f/dt$ = Rate of fall of forward current
 $|IRM(REC)|$ = Peak reverse recovery current
 t_{rr} = Reverse recovery time
 Q_{RR} = Reverse recovered charge

Fig. 4 – Reverse Recovery Time Test Waveform

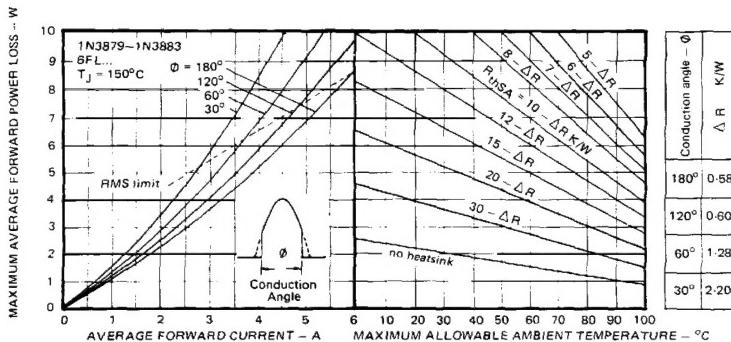


Fig. 5 – Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

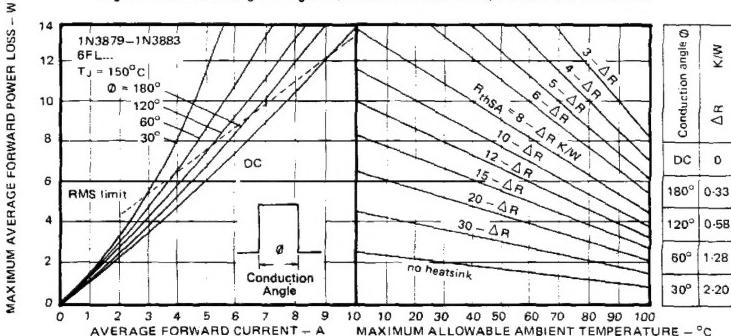


Fig. 6 – Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

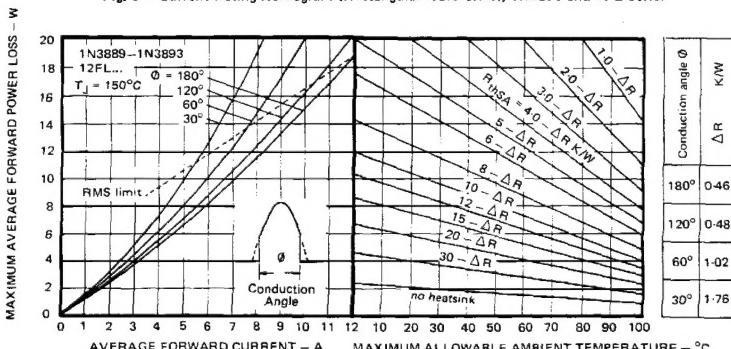


Fig. 7 – Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series

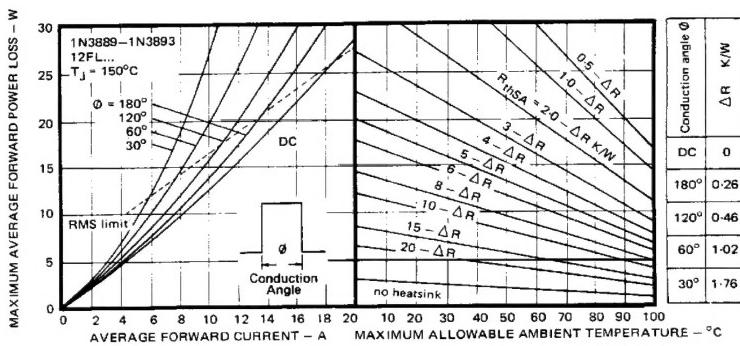


Fig. 8 – Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

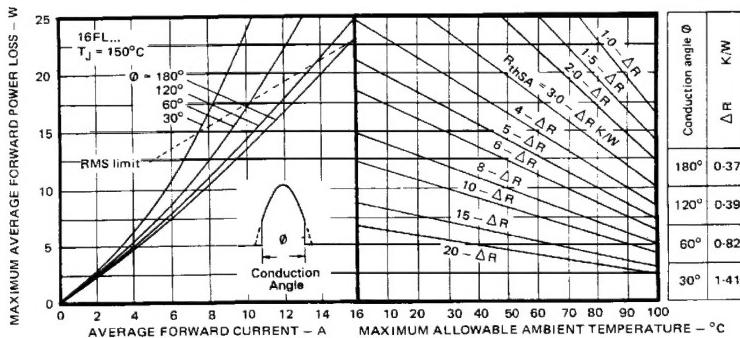


Fig. 9 – Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series

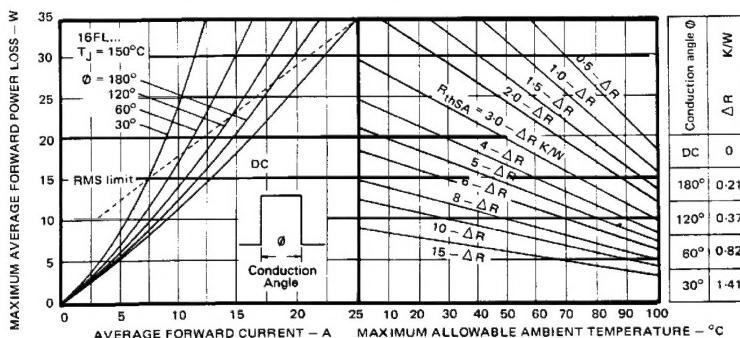


Fig. 10 – Current Rating Nomogram (Rectangular Waveforms), 16FL Series

1N3879, 1N3889, 6FL, 12FL, 16FL Series

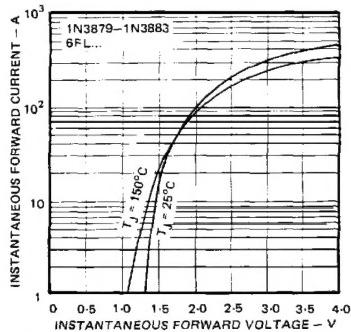


Fig. 11 — Maximum Forward Voltage Vs. Forward Current, 1N3879 and 6FL Series

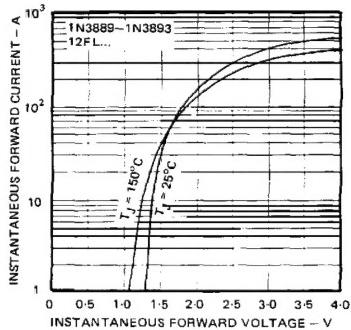


Fig. 13 — Maximum Forward Voltage Vs. Forward Current, 1N3889 and 12FL Series

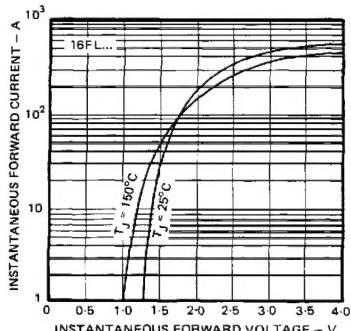


Fig. 15 — Maximum Forward Voltage Vs. Forward Current, 16FL Series

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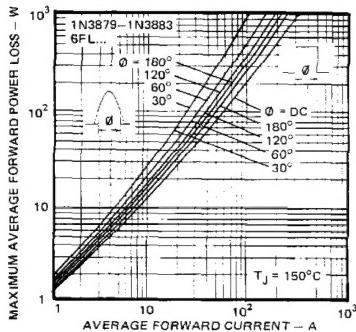


Fig. 12 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3879 and 6FL Series

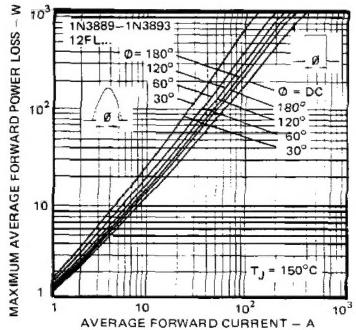


Fig. 14 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3889 and 12FL Series

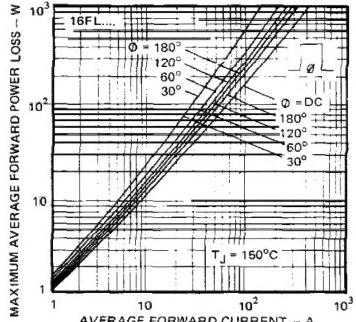


Fig. 16 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 16FL Series



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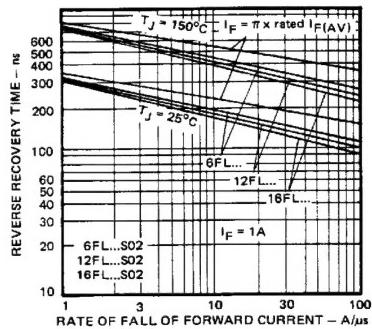


Fig. 17A — Maximum Reverse Recovery Time Vs.
Rate of Fall of Forward Current, All Series _S02

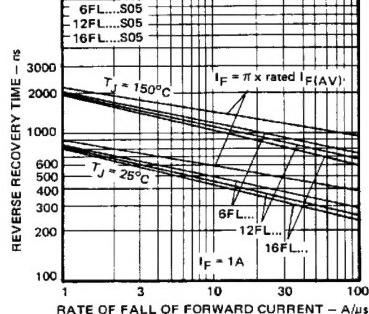


Fig. 18A — Maximum Reverse Recovery Time Vs.
Rate of Fall of Forward Current, All Series _S05

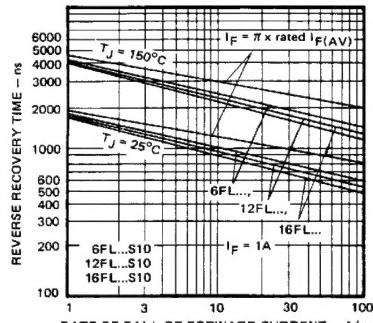


Fig. 19A — Maximum Reverse Recovery Time Vs.
Rate of Fall of Forward Current, All Series _S10

1N3879, 1N3889, 6FL, 12FL, 16FL Series

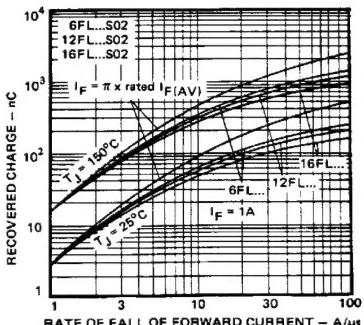


Fig. 17B — Maximum Recovered Charge Vs. Rate of
Fall of Forward Current, All Series _S02

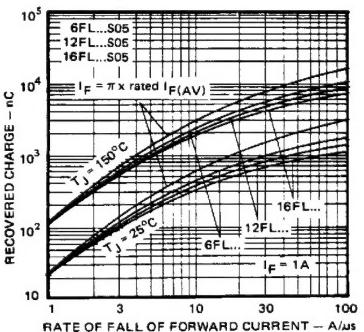


Fig. 18B — Maximum Recovered Charge Vs. Rate of
Fall of Forward Current, All Series _S05

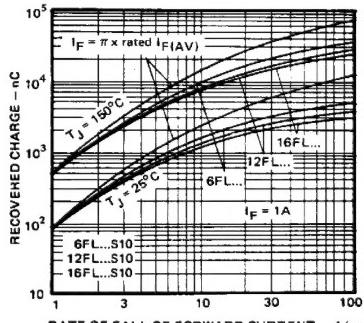


Fig. 19B — Maximum Recovered Charge Vs. Rate of
Fall of Forward Current, All Series _S10

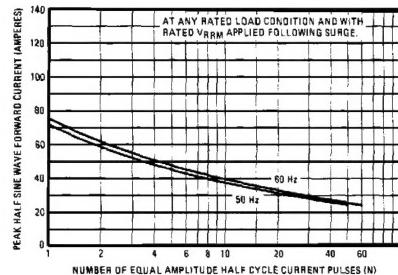


Fig. 20 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3879 Series

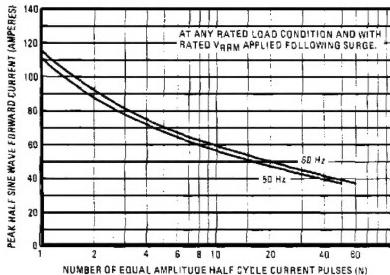


Fig. 21 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 6FL Series

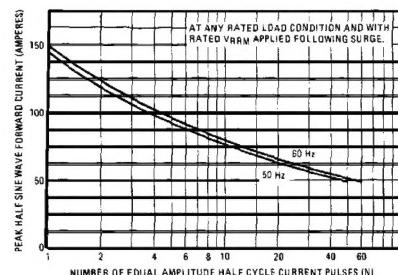


Fig. 22 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3889 and 12FL Series

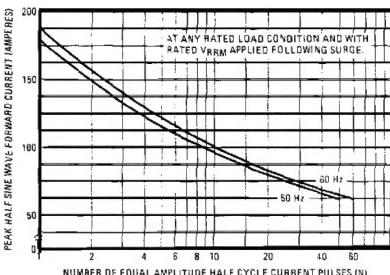


Fig. 23 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 16FL Series

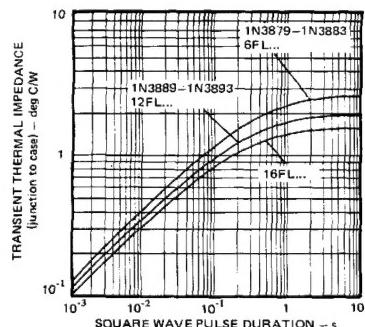


Fig. 24 — Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, All Series.